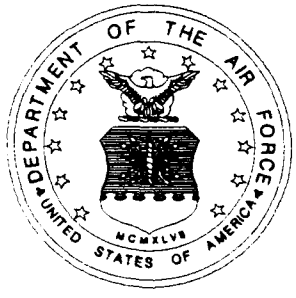
ETL 91- 4
14 JUNE 1991

ENGINEERING TECHNICAL LETTER

SITE SELECTION CRITERIA FOR FIRE PROTECTION TRAINING AREAS



OFFICE of THE CIVIL ENGINEER
DIRECTORATE of MILITARY CONSTRUCTION
ENGINEERING DIVISION

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, DC 20332-5000

14 JUN 1991

CECE

Engineering Technical Letter (ETL) 91 - 4: Site Selection Criteria for Fire Protection Training Areas

See Distribution

1. PURPOSE. This letter provides criteria for the selection of environmentally acceptable sites for the construction of fire protection training facilities and apparatus.

2. APPLICATION.

a. This ETL shall apply to both structural fire and aircraft crash fire rescue training facilities. These criteria shall not be used to eliminate any fire protection training system installed prior to the date of this ETL.

b. This ETL is mandatory for all projects having not reached completion of the Project Definition (PD) phase and for any projects beyond this point not currently in an active design status.

c. This ETL shall not be used as a reference document for the procurement of facility construction. It is to be used in the planning and site selection for fire training facilities. It may be used for purchase of engineering studies related to the planning and site selection for fire training facilities.

3. IMPLEMENTATION. This ETL is to be implemented in accordance with AFR 8-7, Air Force Engineering Technical Letters (ETL). Waivers will be processed in accordance with the procedure established by AFR 88-15.

a. HQ USAF/CECE is responsible for the management and currency of this criteria and for the approval/disapproval of permanent waivers IAW AFR 88-15, paragraph 15.63, Waivers and Deferrals.

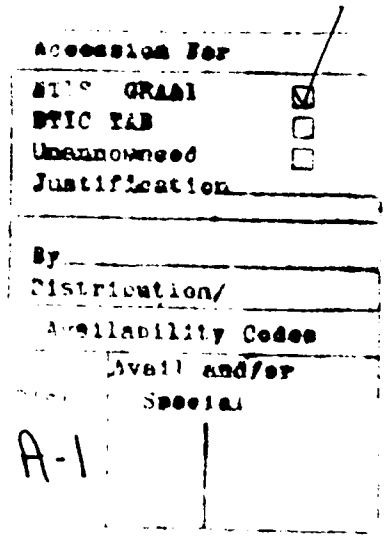
b. MAJCOM. The MAJCOM evaluates waiver requests IAW AFR 88-15, paragraph 15.63, Waivers and Deferrals.

4. Design cannot remain static any more than the airpower functions it serves or the technologies it uses. Accordingly, recommendations for improvement are encouraged and should be furnished to HQ USAF/CECE, Bolling AFB, DC 20332-5000, DSN 297-4082, Comm (202) 767-4082.

FOR THE CHIEF OF STAFF

Enclosure
Criteria and Technical Data

CHARLES L. [illegible], Colonel, USAF
Director, Military Construction
Office of The Civil Engineer



ENCLOSURE 1

Engineering Criteria and Technical Guidance for Fire Protection Training Facility Site Selection

TABLE OF CONTENTS

1. INTRODUCTION: This document provides guidance for selecting suitable locations for new Fire Training Areas (FTAs) at Air Force bases where construction of new fire training facilities is planned. This guidance supports the base's environmental responsibilities through the choice of a suitable site that reduces the risk of contaminant releases and minimizes the possibility of environmental harm if a release occurs.

2. REFERENCED PUBLICATIONS.

a. AFR 8-7, Air Force Engineering Technical Letters, January 1986.

b. AFM 85-21, Operation and Maintenance of Cross-Connection Control and Backflow Prevention Systems, February 1982.

c. Environmentally Acceptable Live Fire Training Facility Site Selection Guide, October 1986.

d. AFR 92-1, Fire Protection Program, December 1988.

e. Engineering Technical Letter (ETL) 86-8, Aqueous Film Forming Foam (AFFF) Waste Discharge Retention and Disposal, 4 June 1986.

3. BACKGROUND: Many of the past Air Force fire training activities throughout the Air Force have resulted in adverse environmental impact. Unlined earthen areas/basins have been used at many installations to support live fire training exercises. This has resulted in soil contamination and has the potential to cause ground water contamination. Continued use of unlined and unpermitted fire training facilities on Air Force installations violates the Clean Water Act; the Comprehensive Environmental Response, Compensation, and Liability Act; and the Resource Conservation and Recovery Act; and poses serious threats of ground water contamination. Live crash fire training of Air Force firefighters is an essential part of the Air Force mission support. Environmentally unacceptable fire training pits are being closed down by state and local regulators at several locations. Prompt actions to replace unacceptable fire training facilities have been encouraged by the Air Staff and a first generation set of generic design drawings for an environmentally acceptable fire training facility was issued to Major Commands in February 1987. Use of inadequate fire training facilities should be discontinued and projects to construct new environmentally acceptable training facilities programmed.

4. EVALUATION PROCESS: The process involves four steps for selecting a site and must be followed prior to submitting programming packages for a live fire training facility on an Air Force installation.

a. STEP ONE: Identify locations for evaluation. At least several new candidate locations should be initially considered. Former/existing fire training areas should only be considered in addition to the new candidate locations.

b. STEP TWO: Complete a "Fire Training Area Site Selection Checklist" for each location. A number of environmental and civil engineering tests will be required to complete all the checklist items. Tests include such things as soil and aquifer sampling, land survey, soil load-bearing capacity, etc.

c. STEP THREE: Form a committee with representatives of environmental management, fire department, engineering as mandatory members. Repersentatives of weather, safety, bioenvironmental engineering, and other base agencies may be included in the committee membership.

(1). Rank order the considered locations. It is preferable to site a new FTA on an uncontaminated site. When there are no suitable clean sites, the least contaminated site may be selected if adequate cleanup could be complete before construction.

(2). Determine if the top candidate site(s) are acceptable. If yes continue to STEP FOUR; if not return to STEP ONE.

d. STEP FOUR: Develop a programming package for the site including the completed "Fire Training Area Site Selection Checklist" for the site.

5. GENERAL EVALUATION FACTORS:

a. SITE HISTORY:

It is important that any leakage from a new FTA be traceable and verifiable. Therefore, sites with existing contamination in soil or ground water systems must be avoided.

Proposed sites for new fire training facilities should be inspected for the presence of contaminants in the soil and uppermost aquifer. If contaminants are present, the site should be eliminated from consideration pending possible remediation. Pollutants found in monitoring locations will result in expensive studies and delays that will impact the fire training program and, therefore, affect readiness. If the proposed site has been used as a hazardous waste disposal area and any Installation Restoration Program (IRP) actions are pending, it should be eliminated without further consideration.

Sites that have been identified as potential remedial action sites in IRP Preliminary Assessment should be avoided because they may be subject to further investigation and, possibly, to corrective actions or monitoring. If cleanup is required by the IRP findings, the area would be affected to the extent that any surface structures, such as a new FTA, would be demolished in the cleanup process.

If the IRP studies prescribe long-term monitoring, the data collected by the monitoring system could be biased by pollution from a new training area on the site, or the training area performance could be biased by drift in the data accumulated by the monitoring system.

An IRP recommendation to monitor a site may be changed to a cleanup recommendation by the results of the monitoring. The movement of contaminants through soil and ground water is very slow. Several years may pass before concentrations of a pollutant migrate down to aquifers where they can be detected by a monitoring system.

When pollutants are detected in ground water, their source and the time of their release are often difficult to determine.

When capping is an acceptable action, it is economically attractive to consider capping an old FTA with a new leak-free fire training facility. However, state regulatory agencies have not permitted new construction on contaminated sites in the past unless that construction is clearly for the purpose of mitigating the existing problem. Because a new FTA could continue to contribute to the existing problem, its use as a cap must be supported by extensive studies of local hydrology, geology, topography, and engineering to ensure low risk of containment system failure.

Many state regulatory agencies would be expected to reject plans to cap with a new training facility because the facility would continue to present an environmental risk with the same pollutant that created the problem.

Siting in an already contaminated area nullifies one of the major improvements in the new design. The new, double-lined concept generic FTA design is monitored for leaks in the liner system. However, if the area already has some JP-4 contamination, it becomes difficult to determine whether changes in JP-4 contamination levels are caused by migration of old JP-4 or by new leakage of fuel through the new liner system.

When a site is already contaminated, there is a risk that future "cleanup" would destroy a new FTA constructed on the site or render it useless because of regulatory changes.

(1). Inspection

Inspect proposed sites for the presence of hazardous substances or organics traceable to JP-4 in the soil and uppermost aquifer.

(2). Contaminated Aquifer

If contaminants are present in the aquifer, consider the site only as a last alternative. Review the base Installation Restoration Program (IRP) documents to see if cleanup, studies, or other actions are pending.

(3). Contaminated Soil

If contaminants are present only in the soil, construction on the site may be possible if the soil can be cleaned up or capped in a way that satisfies responsible regulatory agencies. Site capping may be a cheap alternative, but it is a high-risk action. Future regulatory changes or failure of the cap system may take the site out of compliance.

Existing contamination might impair the leak-monitoring function of the new FTAs.

b. HYDROLOGY CONSIDERATIONS:

The new training area should be sited as far as possible from water supply wells. When there are privately or publicly owned water wells in the vicinity of the proposed site, the aquifer supplying the wells and its direction of flow must be identified. Studies of local geohydrology must be conducted to ensure that the wells are protected from migration of training area contaminants if the double-containment system is breached.

(1). Separation

Locate at least 1000 feet from the nearest well in low permeability soil types. More separation is desirable in high permeability soil types.

(2). Inadequate Separation

If water wells are located within 1000 feet of the FTA boundary, consider the site only as a last resort.

Determine the depth and direction of flow of the supplying aquifer. The FTA should be located on the downgradient side of any water supply well.

Develop contingency plans to manage future well contamination problems where the FTA might be a suspected source.

c. GEOLOGY/TOPOGRAPHY CONSIDERATIONS:

New fire training facilities must be constructed on ground not subject to flooding to prevent washout of JP-4, AFFF, and other contaminants. The electrical and mechanical equipment associated with the training area is weatherproof, but it is not submersible and would be damaged by flooding.

The training area covers several acres. Because the finished surface is nearly flat, construction costs associated with earth moving are minimized when the natural terrain is level.

The vehicles used in training weigh up to 133,000 pounds. Preparation of a base suitable for maneuvering these vehicles is simplified by locating it on a site made up of good load-bearing soil types.

The flexible membrane liners required by the design must be installed on smooth clay or sandy soil surfaces. The proposed site should be made up of these soil types and should be relatively free of rocks and gravel.

The direction of the prevailing wind at a base determines the orientation of the training area components. The trainees should normally have the wind at their backs, and facility operators should be located to one side of the pit so they can see the fire and the firefighters.

At every base, winds are recorded and plotted on a wind rose which is a circular chart that depicts historical wind direction and velocity as a function of compass heading for a particular location. Many bases have separate roses for all weather and instrument flying conditions. Because weather that generates instrument flying conditions is generally not suitable for fire training, the all-weather rose should be used in laying out the training area.

At many bases, the second most prevalent wind quadrant is directly opposite the prevailing wind quadrant. (The diameter of the rose that bisects these two quadrants will usually match the runway direction on the Base.) The third most likely and least likely wind quadrants will normally be opposite one another and perpendicular to the prevailing wind.

Site-specific conditions must be considered when analyzing wind roses. Some areas of the United States have totally different wind patterns in different seasons of the year and have severe winters that restrict training to warm seasons. At those sites the prevailing wind during the training seasons should be used in place of an annual wind rose to lay out the FTA components.

(1) Elevation

Locate above the 50-year flood plain.

(2) Size

The smallest functional FTA is approximately 450 feet square. Earth-moving costs are minimized if the site is level.

(3) Maneuvering Area

Fire trucks used in training weigh up to 133,000 pounds. Drive-around area preparation is easier if the soil has good load-bearing capacity.

(4) Wind Direction

Remember that wind directions are given as the direction from which the wind blows. Use the base all-weather wind rose to locate equipment on the selected site. Consider the prevailing wind direction when choosing a site so that smoke will normally blow away from residential areas.

(5) Physical Separation

The operations conducted spark considerable public interest, some good and some adverse. When possible, site FTAs away from public view. Since training operations must be conducted during all hours of the day, the noise and light should not impact government personnel or off-base populations.

d. FIRE DEPARTMENT OPERATIONAL CONSIDERATIONS:

There are two main concerns, first is fire fighter safety. The site must be large enough so as not to place the firefighters and vehicle is too close a proximity. The site must not include topographic features like unusual dropoffs, ditches and other hazards which place the firefighter at risk especially during night training operations.

Due to the very limited firefighter manpower available at Air Force installations, training site must be located to permit rapid access by personnel and vehicles to airfield or other emergencies. Vehicles must be able to reach any point on the airfield within four minutes. This assumes the first due vehicle is not responding from the training area.

(1). Entrance

Locate the site entrance parallel with the prevailing wind. If the site is fenced, provide an emergency exit opposite the normal entrance.

(2). Fuel System

Locate the fuel, waste, and pumping systems in the quadrant least likely to have flame and smoke blown into it.

(4). Pit Washout System

Locate the pit drain and washout basin so the prevailing wind blows toward it.

e. BASE UTILITIES SUPPORT:

When available, water, electricity, and sewer services reduce costs, improve safety, and enhance the training activity. However, it is possible to use generators for electric power, tanks trucks for water supply and holding ponds for effluent management.

Large quantities of water are required to operate a fire training facility. A thorough flush and refill of the facility between fires enhances the realism of subsequent training activities. It is generally more cost-effective and safer to supply needed volumes of water by piped water supply than with trucks. Also, construction costs are lower when water and electricity are available.

Electrical service enhances safety by allowing illumination for night training and remote ignition. Pumping of fuel and water is safer with explosion-proof electric motors than with internal combustion engines.

Sanitary sewer access provides an efficient way to move liquid effluent to treatment facilities. It is unlikely that the effluent from a training area will ever be permitted to be discharged to grade. Discharging the effluent through a sewer to a treatment plant is far more desirable than trucking it to a treatment plant because the chance of a spill or leak is reduced and costs are lowered.

Several states have ruled that their volatile organic compound (VOC) control regulations require source treatment of the liquid effluent to prevent release of VOCs to the atmosphere. Locating the training area near base utilities will make installation of source treatment facilities less costly if such treatment becomes a requirement at the site under consideration in the future.

(1). Water Requirements

Water is required for filling and washing out the pit.

(2). Sanitary Sewer

A sanitary sewer leading to a treatment plant is often the lowest-cost means of handling liquid effluent after it leaves the oil/water separator provided the flows and AFFF concentration are controlled. Systems connected to the sanitary sewer require considerably greater quantities of water to operate than do closed loop systems utilizing a holding pond.

(3). Electrical Requirements

The availability of electricity enhances training and safety by providing explosion-proof pumping of JP-4, lighting for night training, and simple handling of effluent and recycle liquids.

(4). Liner Installation

Soil preparation for the liner is easier in clay or sand than it is in rocky soils.

6. REGULATORY FACTORS:

a. BASE, MAJCOM, AIR FORCE, AND DEPARTMENT OF DEFENSE REGULATORY CONSIDERATIONS:

Consider the Bird Aircraft Strike Hazard (BASH) program when siting. Avoid locating the holding pond near runways or provide a screen cover that makes the pond undesirable to birds. Avoid locations that would enhance bird habitat, such as siting a pond near a landfill. When bird habitat enhancement is a necessary or desirable facet of an FTA construction project, use the habitat improvement to draw the birds away from, rather than toward, the aircraft flying area.

Proposed sites must satisfy all applicable regulations. Plans for near-term and long-range base land use must be identified and addressed. Clear zone requirements must be identified and satisfied. USAF training requirements as set forth in MAJCOM and base fire chief policies must not be impaired by FTA size or location. The proposed site must be free from the potential to create safety hazards or impair the base mission by inadvertently obscuring vehicle or aircraft visibility with smoke columns.

Base regulations and long-range planning must be satisfied by the proposed siting. MAJCOM requirements pertaining to training cannot be compromised by the siting choice. AFR 19-2, AFR 92-1, AFR 127-15, AFR 88-15, AFR 127-100, and other applicable regulations must be complied with.

b. LOCAL, STATE, AND FEDERAL REGULATORY CONSIDERATIONS:

Local, state, and federal laws regarding the environment are reviewed by the Corps of Engineers, and pertinent information is summarized and stored in a data base maintained by the Corps as the Environmental Technical Information System (ETIS). The ETIS may be accessed through the Corps of Engineers Research Laboratory (CERL) computer system.

The ETIS is comprised of several subsystems, including the Computer-Aided Environmental Legislative Data System (CELDS), which contains abstracts of all the environmental regulations of the federal government and the 50 states. CELDS permits an easy but comprehensive search of pertinent regulations that may impact FTAs at any location.

For help in using ETIS, contact the ETIS Support Center, University of Illinois, 909 West Nevada, Urbana, IL 61801, (217) 333-1369. For information about ETIS, contact US Army Construction Engineering Research Laboratory, (217) 352-6511, Ext. 447.

(1). Special Concerns

Determine if the base area falls within special environmental restrictions or controls, such as wetlands or air quality compliance, and avoid those areas.

(2). Specific Laws

Determine any specific local or state laws affecting FTAs.

FIRE TRAINING AREA SITING CHECKLIST[1,2]

GENERAL EVALUATION FACTORS[3]

Site History

Prior site use			
Previous FTA	NO( )	YES( )	attach details
Previous use as a disposal area	NO( )	YES( )	attach details
Evidence of contamination			
Fuel-related organics in ground water	NO( )	YES( )	attach details
Off-base public/private potable water wells	NO( )	YES( )	attach details
Off-base public/private non-potable water wells	NO( )	YES( )	attach details
On-base potable water wells	NO( )	YES( )	attach details
On-base non-potable water wells	NO( )	YES( )	attach details
Fuel-related organics in soils	NO( )	YES( )	attach details
Fuel-related organics in surface water	NO( )	YES( )	attach details

Hydrology Considerations

Adequate separation from water sources			
Off-base public/private potable water wells	YES( )	NO( )	attach details
Off-base public/private non-potable water wells	YES( )	NO( )	attach details
On-base potable water wells	YES( )	NO( )	attach details
On-base non-potable water wells	YES( )	NO( )	attach details
Is site downgradient from water sources			
Off-base public/private potable water wells	YES( )	NO( )	attach details
Off-base public/private non-potable water wells	YES( )	NO( )	attach details
On-base potable water wells	YES( )	NO( )	attach details
On-base non-potable water wells	YES( )	NO( )	attach details
Acceptable ground water level	Actual( )feet below surface		
Surface water			
Spills and overflows can be contained on-site	YES( )	NO( )	attach details

Geology/Topography Considerations

Site above 50-year flood plain	YES( )	NO( )	attach details
Acceptable soil load-bearing capacity	Actual( )psf		Attach details
Acceptable slope (not to exceed 3% over the entire area)	Actual( )%		

FIRE TRAINING AREA SITING CHECKLIST (PAGE 2)

Geology/Topography Considerations (Con't)

Prevailing wind away from populated areas			
Actual direction	( )degrees		
Off-base	YES( )	NO( )	attach details
On-base	YES( )	NO( )	attach details
Adequate separation from populated areas			
Off-base	YES( )	NO( )	attach details
On-base	YES( )	NO( )	attach details

Operational Considerations

Site all-weather access	YES( )	NO( )	attach details
Airfield access - all points within four minutes	YES( )	NO( )	attach details
Site safety hazards	NO( )	YES( )	attach details

Utilities Access Considerations

Water available within 300 yards	YES( )	NO( )	attach details
Electricity available within 300 yards	YES( )	NO( )	attach details
Sewer available within 300 yards	YES( )	NO( )	attach details

REGULATORY FACTORS

Base/Air Force/Department of Defense Requlatory Considerations

Clear zones	ATTACH DETAILS RELATED TO THIS SITE
Structure height	ATTACH DETAILS RELATED TO THIS SITE
Bird nuisance	ATTACH DETAILS RELATED TO THIS SITE
Fire training	ATTACH DETAILS RELATED TO THIS SITE

Local/State/Federal Requlatory Considerations

Requirements identified in ETIS search	NO( )	YES( )	attach details
Permitting required	NO( )	YES( )	attach details

Footnotes:
1 A separate check sheet should be completed for each candidate location.
2 Checks in the left column are positive responses. Checks in the right column are negative responses, and details are required to evaluate the effect.
3 The general evaluation factor groups are listed in relative order of importance.

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
82-2	Energy Efficient Equipment	10 Nov 82
83-1	Design of Control Systems for HVAC	16 Feb 83
	Change No. 1 to ETL 83-1, U.S. Air Force Stndardized Heating, Ventilating & Air Conditioning (HVAC) Control Systems	22 Jul 87
83-3	Interior Wiring Systems, AFM 88-15 Para 7-3	2 Mar 83
83-4	EMCS Data Transmission Media (DTM) Considerations	3 Apr 83
83-7	Plumbing, AFM 88-8, Chapter 4	30 Aug 83
83-8	Use of Air-to-Air Unitary Heat Pumps	15 Sep 83
83-9	Insulation	14 Nov 83
84-2	Computer Energy Analysis	27 Mar 84
	Change 1 Ref: HQ USAF/LEEEU Msg 031600Z MAY 84 1 Jun 84	
84-7	MCP Energy Conservation Investment Program (ECIP)	13 Jun 84
84-10	Air Force Building Construction and the Use of Termiticides	1 Aug 84
86-2	Energy Management and Control Systems (EMCS)	5 Feb 86
86-4	Paints and Protective Coatings	12 May 86
86-5	Fuels Use Criteria for Air Force Construction	22 May 86
86-8	Aqueous Film Forming Foam Waste Discharge Retention and Disposal	4 Jun 86
86-9	Lodging Facility Design Guide	4 Jun 86
86-10	Antiterrorism Planning and Design Guidance	13 Jun 86
86-14	Solar Applications	15 Oct 86
86-16	Direct Digital Control Heating Ventilation and Air Conditioning Systems	9 Dec 86
87-1	Lead Ban Requirements of Drinking Water	15 Jan 87
87-2	Volatile Organic Compounds	4 Mar 87
87-4	Energy Budget Figures (EBFs) for Facilities in the Military Construction Program	13 Mar 87
87-5	Utility Meters in New and Renovated Facilities	13 Jul 87
87-9	Prewiring	21 Oct 87

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
88-2	Photovoltaic Applications	21 Jan 88
88-3	Design Standards for Critical Facilities	15 Jun 88
88-4	Reliability & Maintainability (R&M) Design Checklist	24 Jun 88
88-5	Cathodic Protection	2 Aug 88
88-6	Heat Distribution Systems Outside of Buildings	1 Aug 88
88-8	Cholorfluorocarbon (CFC) Limitation in Heating, Ventilating and Air-Conditioning (HVAC) Systems	4 Oct 88
88-9	Radon Reduction in New Facility Construction	7 Oct 88
88-10	Prewired Workstations Guide Specification	29 Dec 88
89-2	Standard Guidelines for Submission of Facility Operating and Maintenance Manuals	23 May 89
89-3	Facility Fire Protection Criteria for Electronic Equipment Installations	9 Jun 89
89-4	Systems Furniture Guide Specification	6 Jul 89
89-6	Power Conditioning and Continuation Interfacing Equipment (PCCIE) in the Military Construction Program (MCP)	7 Sep 89
89-7	Design of Air Force Courtrooms	29 Sep 89
90-1	Built-Up Roof (BUR) Repair/Replacement Guide Specification	23 Jan 90
90-2	General Policy for Prewired Workstations and Systems Furniture	26 Jan 90
90-3	TEMPEST Protection for Facilities Change 1 Ref: HQ USAF/LEEDE Ltr dated 20 April 90, Same Subject	20 Apr 90
90-4	1990 Energy Prices and Discount Factors for Life-Cycle Cost Analysis	24 May 90
90-5	Fuel and Lube Oil Bulk Storage Capacity for Emergency Generators	26 Jul 90
90-6	Electrical System Grounding, Static Grounding and Lightning Protection	3 Oct 90
90-7	Air Force Interior Design Policy	12 Oct 90
90-8	Guide Specifications for Ethylene Propylene Diene Monomer (EPDM) Roofing	17 Oct 90
90-9	Fire Protection Engineering Criteria for Aircraft Maintenance, Servicing, and Storage Facilities	2 Nov 90

14 Jun 91

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
90-10	Commissioning of Heating, Ventilating, and Air Conditioning (HVAC) Systems Guide Specification	17 Oct 90
91-1	Fire Protection Engineering Criteria Testing Halon Fire Suppression Systems	2 Jan 91
91-2	High Altitude Electromagnetic Pulse (HEMP) Hardening in Facilities	4 Mar 91
91-3	Water Supply for Fire Protection	14 Jun 91
91-4	Site Selection Criteria for Fire Protection Training Areas	14 Jun 91

SECTION B - OBSOLETE ETLs

No.	Date	Status
82-1	10 Nov 82	Superseded by ETL 83-10, 86-1, 87-4
82-3	10 Nov 82	Superseded by ETL 83-5, 84-2
82-4	10 Nov 82	Superseded by ETL 84-7
82-5	10 Nov 82	Superseded by ETL 84-1, 86-13, 86-14
82-6	30 Dec 82	Cancelled
82-7	30 Nov 82	Cancelled
83-2	16 Feb 83	Superseded by ETL 84-3
83-6	24 May 83	Cancelled
84-3	21 Mar 84	Cancelled
84-4	10 Apr 84	Superseded by ETL 86-7, 86-15, 87-5
84-5	7 May 84	Superseded by ETL 84-8, 86-11, 86-18, 88-6
84-6	Not Issued	Cancelled/Not Used
84-9	5 Jul 84	Superseded by ETL 88-7
86-3	21 Feb 86	Superseded by ETL 86-4
86-6	3 Jun 86	Superseded by ETL 86-11, 86-18, 88-6
86-7	3 Jun 86	Superseded by ETL 86-15
86-12	3 Jul 86	Superseded by ETL 90-2
86-13	18 Aug 86	Superseded by ETL 86-14
86-15	13 Nov 86	Superseded by ETL 87-5
86-17	17 Dec 86	Superseded by ETL 89-6
86-18	18 Dec 86	Superseded by ETL 88-6
87-3	12 Mar 87	Superseded by ETL 87-6, ETL 88-5
87-6	21 Aug 87	Superseded by ETL-88-5
87-7	14 Oct 87	Superseded by ETL 89-1
Chg 1	30 Dec 87	Superseded by ETL 90-1
88-1	5 Jan 88	Superseded by ETL 89-2
88-7	24 Aug 88	Superseded by ETL 90-3, ETL 91-2
89-1	6 Feb 89	Superseded by ETL 90-4
89-5		Issued as ETL 90-7